

# **INTRODUCTION TO APPENDICES TO THE FINAL PROGRAMMATIC EIS FOR OYSTER RESTORATION IN CHESAPEAKE BAY**

In 2004, when preparation of the PEIS began, numerous research studies of the Suminoe oyster were initiated, and several projects were established specifically to conduct analyses to support the PEIS. The latter projects were undertaken through collaboration among research scientists and resource managers, guided by the lead and cooperating Federal agencies. Several peer-reviewed articles based on the work conducted in those supporting projects have been published in scientific journals; however, many of the findings of those projects and the extensive amount of supporting data and information used in them are not readily available to the public. This series of appendices is included with the Final PEIS to document the work conducted and make the supporting data and information used in many of the analyses presented in Section 4 of the Final PEIS readily available to readers:

- Appendix A – A Demographic Model of Oyster Populations in the Chesapeake Bay to Evaluate Proposed Oyster-Restoration Alternatives
- Appendix B – Ecological Risk Assessment for Oyster Restoration Alternatives
- Appendix C – Development of Assessment Scenarios for Aquaculture Alternatives for the PEIS for Oyster Restoration
- Appendix D – Economics Analyses for the PEIS for Oyster Restoration
- Appendix E – Evaluation of Cultural and Socioeconomic Effects of Oyster Restoration Strategies for Chesapeake Bay
- Appendix F – Cultural History of the Chesapeake Bay Region
- Appendix G – Agency Coordination
- Appendix H – Chesapeake Bay Environmental Modeling Package
- Appendix I – Formal Responses to Comments
- Appendix J – Public Comments on Draft PEIS for Oyster Restoration

Appendices A, B, D and E document results of projects initiated specifically for PEIS analyses. Appendices C, F, and H document information used in analyses of some elements of the affected environment. Appendix G documents all requests for information from Federal agencies and responses received during development of the Final PEIS. Appendix I and J document formal responses to public comments on the Draft PEIS and all comments received during the 60-day comment period, respectively.

The purpose of implementing the proposed action or one of the alternatives is to increase the abundance of oysters throughout the Bay. Given that purpose, the initial plan for conducting analyses for the PEIS was to develop a computer model of the demographics of the oyster population in Chesapeake Bay that could be used to predict the size of the population likely to result from implementing any of the various actions being considered in the PEIS. Model

developers assumed that the details of the population dynamics of the Eastern oyster in Chesapeake Bay had been documented during the decades of study that scientists and managers throughout the Bay region have devoted to the species, and that such documentation could serve as the basis for constructing the oyster demographic model (ODM). Results of the studies of the Suminoe oyster could then be used to modify parameters of the ODM to account for differences in the two species' biology. The ODM was anticipated to serve as a means of projecting future oyster abundance that might result from implementing the proposed action or any of the alternatives. Projections of oyster abundance would then be used to compare the ecological, economic, and socioeconomic consequences of the proposed action and alternatives.

All of the projects and analyses for the PEIS were subjected to peer review in accordance with the *Peer Review Plan to Support the Programmatic Environmental Impact Statement for Evaluating Oyster Restoration Alternatives for the Chesapeake Bay, Including the Use of Native and Nonnative Oysters* (<http://www.dnr.state.md.us/dnrnews/infocus/oysters.asp>). The results of peer reviews and responses for all PEIS projects are posted at <http://www.nao.usace.army.mil/OysterEIS/PeerReviews/homepage.asp>. An independent Oyster Advisory Panel (OAP) was designated to review the ODM. In November, 2007, the OAP concluded that ODM projections of outcomes for the Eastern oyster "...might be taken at face value with the condition that there are significant uncertainties as outlined in the OAP review..." but that it would be inappropriate to attempt to use the ODM to project the outcome of introducing the Suminoe oyster (see the Note to Readers of Appendix A for more details). In accordance with that guidance, a pre-draft PEIS reported analyses based on ODM projections only for alternatives that involved the Eastern oyster exclusively (i.e., Alts. 1, 2, and 3). It also presented an interpretive summary of the results of recent research on the characteristics and possible behavior of the Suminoe oyster in Chesapeake Bay to provide the basis for informed judgment about the potential outcomes of implementing the proposed action and included exploratory ODM projections intended to inform the assessment of the proposed action. ODM projections of the abundance of Eastern oysters for Alternatives 1, 2, and 3 were provided to the researchers who considered ecological risk and economic and socioeconomic consequences to serve as a basis for their evaluations of those alternatives. Results of the exploratory ODM projections intended to assess the potential growth of a population of Suminoe oysters in Chesapeake Bay also were provided to the researchers for use in their analysis of the proposed action.

In addition to reviewing the ODM, the OAP was assigned responsibility for the overall peer review of the PEIS prior to its publication. The members of the OAP had their first opportunity to review how ODM results initially were used in all of the PEIS analyses during their review of a pre-draft version of the PEIS in the summer of 2008. The OAP concluded that PEIS analyses relied too heavily on ODM results given the substantial uncertainties associated with ODM outcomes. The OAP's major criticisms of the pre-draft are quoted here:

- The quantitative results from the ODM should be used only as guidance; the complexity and lack of understanding of the oyster restoration problem is not resolved by quantitative output from the model.

- The lack of a focus on the best bars gives an overly pessimistic view of oyster production. A lack of focus on the best bars might also change the ranking among alternatives.
- The unbalanced age structure evident in model input could arise from an under-sampling of spat and perhaps small oysters relative to market oysters. It also could result from much lower growth rate as relating to a complex mixture of age classes. It would seem that this would decrease the mortality rate. Would this mean then that mortality rates are less than those contemplated in the ODM? How does the unbalanced age structure interrelate with the stock-recruitment of oysters as depicted by the ODM?

In response to the OAP's concerns about the inappropriate use of ODM projections, analyses presented in the Environmental Consequences section of the pre-draft PEIS were substantially revised to de-emphasize ODM results before releasing the PEIS to the public. The effect of de-emphasizing ODM projections in the PEIS cascades through the analyses of ecosystem effects and economics because ODM outcomes were used in several analyses. Although the time frame for issuing the PEIS allowed for including some new analyses in Section 4 (Environmental Consequences), available time was insufficient to revise the appendices that document work conducted before the OAP's review of the pre-draft. As a result, many of the results presented in Appendices A, B, and D are not discussed in Section 4 of the Final PEIS and, conversely, some analyses now in the Final PEIS are not documented in those appendices. Much of the information reported in those appendices, nevertheless, served as a basis for analyses described in Section 4. Removing the appendices from the Final PEIS because the results of some analyses have been superseded would remove reference information that is critical for understanding many elements of the analyses of environmental consequences presented in Section 4.

A Note to the Reader appears on the cover page of each appendix whose content is inconsistent with analyses presented in Section 4 of the Final PEIS. The Notes explain apparent discrepancies between Section 4 and the appendices by describing the consequence of the OAP's review of the pre-draft for use of the findings reported in the appendix, the specific issues the OAP raised, and how those issues were addressed in Section 4.

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